Complete Summary

GUIDELINE TITLE

Use of antibiotics in paediatric care.

BIBLIOGRAPHIC SOURCE(S)

Singapore Ministry of Health. Use of antibiotics in paediatric care. Singapore: Singapore Ministry of Health; 2002 Mar. 109 p. [193 references]

GUIDELINE STATUS

This is the current release of the guideline.

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

- Upper respiratory tract infections (rhinitis, pharyngitis and tonsillitis, acute sinusitis, acute otitis externa, acute otitis media, recurrent otitis media and otitis media with effusion)
- Lower respiratory tract infections (bronchiolitis, acute laryngotracheobronchitis, bronchitis and pneumonia)
- Upper and lower gastrointestinal disease
- Acute bacterial meningitis
- Upper urinary tract infection (pyelonephritis)
- Lower urinary tract infection (cystitis)
- Bacterial skin infections (impetigo, ecthyma, folliculitis, furunculosis and carbuncles, erysipelas, cellulitis, necrotising fasciitis, staphylococcal scalded skin syndrome, blistering dactylitis, toxic shock syndrome [TSS], methicillin-

resistant Staphylococcus aureus [MRSA] infection and perianal streptococcal dermatitis)

GUIDELINE CATEGORY

Management
Treatment

CLINICAL SPECIALTY

Family Practice
Infectious Diseases
Nursing
Pediatrics
Pharmacology

INTENDED USERS

Advanced Practice Nurses
Clinical Laboratory Personnel
Hospitals
Nurses
Pharmacists
Physician Assistants
Physicians

GUIDELINE OBJECTIVE(S)

To provide recommendations for practitioners in the rational use of antibiotics when dealing with childhood infections

TARGET POPULATION

Children in Singapore who require antibiotic therapy.

High-risk patients such as those who are immunocompromised, have chronic debilitating disease or serious cardiopulmonary conditions are not covered in these guidelines.

INTERVENTIONS AND PRACTICES CONSIDERED

Use of antibiotics in paediatric care, including choice of antibiotics for use with the appropriate indications, correct dosages, and duration needed to achieve optimum results. The following antibiotics are considered:

1. Amikacin
2. Amoxycillin
3. Amoxycillin/clavulanate
4. Ampicillin
5. Ampicillin/sulbactam
6. Azithromycin

7. Cefadroxil
8. Cefoxitin
9. Cephalexin
10. Ceftriaxone
11. Cefotaxime
12. Cefuroxime
13. Clarithromycin
14. Clavulanate
15. Clindamycin
16. Cloxacillin
17. Cotrimoxazole (trimethoprim and sulphamethoxazole)
18. Doxycycline
19. Erythromycin
20. Fusidic acid
21. Gentamicin
22. Imipenem
23. Macrolides
24. Metronidazole
25. Minocycline
26. Mupirocin
27. Nitrofurantoin
28. Omeprazole
29. Paromomycin
30. Penicillins G and V
31. Vancomycin

MAJOR OUTCOMES CONSIDERED

- Antimicrobial sensitivity resistance
- Disease mortality
- Disease morbidity

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

Not stated

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Levels of Evidence

Ia Evidence obtained from meta-analysis of randomised controlled trials.

Ib Evidence obtained from at least one randomised controlled trial.

IIa Evidence obtained from at least one well-designed controlled study without randomisation.

IIb Evidence obtained from at least one other type of well-designed quasi-experimental study.

III Evidence obtained from well-designed non-experimental descriptive studies, such as comparative studies, correlation studies and case studies.

IV Evidence obtained from expert committee reports or opinions and/or clinical experiences of respected authorities.

METHODS USED TO ANALYZE THE EVIDENCE

Review of Published Meta-Analyses
Systematic Review

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Not stated

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Grades of Recommendation

Grade A (evidence levels Ia, Ib) Requires at least one randomised controlled trial as part of the body of literature of overall good quality and consistency addressing the specific recommendation.

Grade B (evidence levels IIa, IIb, III) Requires availability of well conducted clinical studies but no randomised clinical trials on the topic of recommendation.

Grade C (evidence level IV) Requires evidence obtained from expert committee reports or opinions and/or clinical experiences of respected authorities. Indicates absence of directly applicable clinical studies of good quality.

GPP (good practice points) Recommended best practice based on the clinical experience of the guideline development group.

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

The drafts of the guidelines were distributed to the following institutions/organisations for vetting and feedback: Chapter of Paediatricians, Academy of Medicine; Singapore Paediatric Society; College of Family Physicians; Departments of Paediatrics and Neonatology at KK Women´s and Children´s Hospital and National University Hospital; Department of Neonatology, Singapore General Hospital; National Skin Centre; Family Health Service, Ministry of Health; East Shore Hospital; Gleneagles Medical Centre Ltd; Mount Alvernia Hospital; Mount Elizabeth Hospital Ltd; Thomson Medical Centre; Raffles Medical Group Ltd; Singapore Baby and Child Clinic; Deputy Director (Clinical Services), National Neuroscience Institute; and Head, Department of Pharmacology, National University of Singapore. A panel discussion was convened to discuss the drafts and the feedback received from the various groups of doctors. Amendments were made and finally editing was carried out.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Each recommendation is rated based on the levels of the evidence and the grades of recommendation. Definitions of the grades of the recommendations (A, B, C, Good Practice Points) and levels of the evidence (Level I - Level IV) are presented at the end of the Major Recommendations field.

Respiratory Tract Infections

Upper Respiratory Tract Infections

A - Upper respiratory tract infections are usually viral in origin and often do not require antibiotics. (Grade A, Level Ia)

Acute Rhinitis

A - Antibiotics are not indicated for acute rhinitis since the majority are viral in origin (Fahey & Stocks, 1998; Gadomski, 1993; Kaiser et al., 1996). (Grade A, Level Ia)

Pharyngitis and tonsillitis

The following antibiotics should only be given to an older child with possible Streptococcus group A infection who looks unwell, has prolonged fever, sore throat, exudates over the tonsils and enlarged, tender cervical lymph nodes:

A - Penicillin V (50mg/kg/day divided 6hrly for 10 days) (Bisno et al., 1997; Schwartz et al., 1998) (Grade A, Level Ia)

A - Amoxycillin (50mg/kg/day divided 8hrly for 6 days) (Cohen et al., 1996; Peyramond et al., 1996; Pichichero & Cohen, 1997) or (Grade A, Level Ia)

A - Erythromycin (50mg/kg/day divided 6-8hrly for 10 days for patient with penicillin allergy) (Bisno et al., 1997; Schwartz et al., 1998) (Grade A, Level Ib)

Acute sinusitis

A - Acute sinusitis is commonly bacterial in origin and requires amoxycillin or cotrimoxazole (contra-indicated in children with glucose-6-phosphate-dehydrogenase [G6PD] deficiency) (Trimethoprim [TMP] 8mg/kg/day plus Sulphamethoxazole [SMX] 40mg/kg/day divided 12hrly) for 7-10 days if there is a history of penicillin allergy. (Grade A, Level Ia)

C - If there is no response after 72 hours, it is advisable to switch to amoxycillin/clavulanate (amoxycillin 50mg/kg/day + clavulanate 7mg/kg/day divided 12hrly) or ampicillin/sulbactam (25- 50mg/kg/day divided 12hrly). (Grade C, Level IV)

GPP - Referral to an ear, nose, and throat (ENT) specialist is recommended in the presence of complications or when symptoms persist beyond three weeks (Low et al., 1997).

Acute otitis externa

C - Acute otitis externa is commonly caused by Staphylococcus aureus. Topical antimicrobial eardrops (Klein & Bluestone, 1998; Ruddy & Bickerton, 1992) (e.g. polymyxin, framycetin) are sufficient for mild infections. Severe infections can be treated with oral cloxacillin (Bojrab, Bruderly, & Abdulrazzak, 1996; Klein & Bluestone, 1998) for 7 days or erythromycin (if the patient is allergic to penicillin). (Grade C, Level IV)

Acute otitis media

A - Acute otitis media can be treated with amoxycillin for 7 days (Dowell et al., 1999; Kozyrskyj, 1998; Rosenfeld et al., 1994). (Grade A, Level Ia)

If there is no response after treatment for 72 hours, high dosages of the following are recommended:

- A - amoxycillin/clavulanate (Bottenfield et al., 1998; Dowell et al., 1999) (Grade A, Level Ia)
- A - cefuroxime (15-30mg/kg/day divided 12hrly) (Dowell et al., 1999; Kozyrskyj, 1998) (Grade A, Level Ib)

A - In the presence of penicillin allergy, treat with erythromycin or cotrimoxazole (contra-indicated in children with G6PD deficiency) (Rosenfeld et al., 1994). (Grade A, Level Ia)

Recurrent otitis media and otitis media with effusion

A - A child with recurrent otitis media and otitis media with effusion should be referred to an ENT surgeon. (Grade A, Level Ia)

Lower Respiratory Tract Infections

Acute bronchiolitis

A - Acute bronchiolitis is caused by respiratory viruses (mainly Respiratory Syncytial Virus) and antibiotics are not indicated (Friis et al., 1984; Makela, Ruuskanen & Ogra, 1994). Antibiotics can be considered in the presence of bacterial superinfection. (Grade A, Level Ib)

Acute laryngotracheobronchitis

C - Respiratory viruses, mainly parainfluenza virus, are responsible for acute laryngotracheobronchitis. Antibiotics are not indicated (Dawson et al., 1992; Skolnik, 1989). (Grade C, Level IV)

Acute bronchitis

A - Acute bronchitis is mainly viral in origin (Yun et al., 1995) and antibiotics are not routinely recommended (Orr et al., 1993; Smucny et al., 1998). (Grade A, Level Ia)

B - A macrolide is recommended in an older child when mycoplasma infection is suspected. (Grade B, Level III)

Pneumonia

C - Referral to hospital is recommended for newborns with pneumonia. (Grade C, Level IV)

C - In children less than 2 years old, the majority of pneumonias are viral in aetiology and antibiotic therapy is not warranted. Bacterial infection is suggested by toxic appearance, prolonged fever, cough and breathlessness persisting for more than 1 week, crepitations or decreased breath sounds on auscultation, leukocytosis and lobar consolidation. Amoxycillin (Bartlett & Mundy, 1995; Pallares et al., 1995; Pallares et al., 1998) or erythromycin (Barry et al., 1994; Chenoweth & Lynch, 1997; Doern, 1995; Washington, 1996) is the drug of choice. If drug resistant Streptococcus pneumoniae is suspected, high dose amoxycillin is indicated. Second line drugs include amoxycillin/clavulanate or ampicillin/sulbactum (Barry et al., 1994; Chenoweth & Lynch, 1997; Doern, 1995; Scriver, Walmsley, & Kau, 1994; Thornsberry et al., 1997; Washington, 1996). (Grade C, Level IV)

C - For children older than 2 years old, amoxycillin (high dose if resistant Streptococcus pneumoniae is suspected) is recommended (Bartlett & Mundy, 1995; Pallares et al., 1995; Pallares et al., 1998). Second line drugs include amoxycillin/clavulanate or ampicillin/sulbactum (Barry et al., 1994; Chenoweth & Lynch, 1997; Doern, 1995; Scriver, Walmsley, & Kau, 1994; Thornsberry et al., 1997; Washington, 1996). A macrolide is recommended if mycoplasma infection is suspected or penicillin allergy is present (Bartlett & Mundy, 1995). (Grade C, Level IV)

Gastrointestinal Diseases

GPP - The mainstay of management of gastroenteritis is the prevention and correction of dehydration and electrolyte imbalance.

Viral diarrhoea

GPP - Viral diarrhoea should not be treated with antibiotics.

Nontyphoidal salmonella infection

A - Nontyphoidal salmonella infection should not be treated routinely with antibiotics. (Grade A, Level Ia)

C - Antibiotics are required for patients with evidence of extraintestinal spread such as septicaemia, in the very young (< 3 month old) and in the immunocompromised child. (Grade C, Level IV)

C - Cotrimoxazole (TMP, 10mg/kg/day plus SMX, 50mg/kg/day divided 12hrly; contra-indicated in children with G6PD deficiency), ampicillin (200mg/kg/day divided 6hrly) or a third generation cephalosporin (e.g. ceftriaxone 75-100mg/kg/day 24hrly) can be given for up to 14 days. (Grade C, Level IV)

Escherichia coli diarrhoea

C - When the disease is severe, antibiotics such as cotrimoxazole (contra-indicated in children with G6PD deficiency) or ampicillin for 5 to 7 days may be required. (Grade C, Level IV)

Shigellosis

B - Shigellosis responds to antibiotics (Chang et al., 1977; Haltalin et al., 1967). Cotrimoxazole (contra-indicated in children with G6PD deficiency), ampicillin or a third generation cephalosporin can be given for up to 5 days. (Grade B, Level IIa)

Cholera

C - Antibiotics decrease the duration of diarrhoea, excretion of organisms in the stool and total amount of fluid loss. Doxycycline (6mg/kg as a single dose) is the drug of choice for children above 8 years old (Cohen & Laney, 1999; World Health Organization, 1991). (Grade C, Level IV)

Campylobacter gastroenteritis

C - Erythromycin (50mg/kg/day divided 6hrly) for 7 to 10 days (Cohen & Laney, 1999) can be used for patients with severe ongoing illness or if risk factors are present. (Grade C, Level IV)

Yersinia enterocolitis

C - Diarrhoea is self-limiting except for the immunocompromised child who may respond to a third generation cephalosporin in combination with gentamicin (Fasano, 2000) (5mg/kg/day in divided doses). (Grade C, Level IV)

Amoebiasis

C - Antibiotics are employed in the eradication of the amoeba. Treatment consists of metronidazole (35-50mg/kg/day divided 8hrly orally for 10 days) or tinidazole (50-60mg/kg/day as a single dose daily for 3 days) followed by paromomycin (25-35mg/kg/day divided 8hrly for 7 days) (American Academy of Pediatrics, 1997; Singh-Naz & Rodriquez, 1995). (Grade C, Level IV)

Giardiasis

A - Metronidazole (22.5mg/kg/day divided 8hrly orally for 7 days) is effective (American Academy of Pediatrics, 1997; Hill, 1993; Singh-Naz & Rodriquez, 1995; Zaat, Mank, & Assendelft, 2000). (Grade A, Level Ia)

Cryptosporidium

C - Diarrhoeal illness is self-limiting except for the immunocompromised child. Those who are seriously ill may respond to paromomycin (American Academy of Pediatrics, 1997) in combination with azithromycin (Flynn, 2000). (Grade C, Level IV)

Helicobacter pylori

B - Eradication of Helicobacter pylori is important in the prevention of recurrence of Helicobacter pylori-associated peptic ulcer disease. Treatment consists of omeprazole, clarithromycin and metronidazole for 1 to 2 weeks (Casswall et al., 1998; Dohil, Israel, & Hassell, 1997; Walsh et al., 1997). (Grade B, Level III)

Acute Bacterial Meningitis

GPP - Blood culture, cerebrospinal fluid (CSF) microscopy and culture should be carried out when a clinical diagnosis of meningitis is made. Empirical antibiotics should be started with necessary alteration when the culture and sensitivities become available.

B - For infants below 1 month of age, the likely organisms are Group B Streptococcus, E. coli or Listeria monocytogenes. Ampicillin (200-300mg/kg/day divided 4-8hrly) + gentamicin or ampicillin + cefotaxime** (100-200mg/kg/day divided 6-12hrly) / ceftriaxone** 50-75mg/kg/day 12-24hrly) are the drugs of

choice. (Refer to the original guideline document for additional information.) (Grade B, Level III)

B - For infants between 1 and 3 months of age, the likely organisms include Group B Streptococcus, Escherichia coli, Listeria monocytogenes, Streptococcus pneumoniae, Neisseria meningitidis and Haemophilus influenzae type b. Ampicillin plus ceftriaxone/cefotaxime are the drugs of choice. (Grade B, Level III)

A - For infants above 3 months of age, the likely organisms include Streptococcus pneumoniae, Neisseria meningitidis and Haemophilus influenzae type b. The drug of choice is ceftriaxone or cefotaxime. (Grade A, Level Ib)

C - Vancomycin (60mg/kg/day divided 6hrly) is added when antibiotic resistant Streptococcus pneumoniae is suspected. (Refer to the original guideline document for additional information.) (Grade C, Level IV)

A - Chemoprophylaxis should be considered in contacts of patients with Haemophilus influenzae type b or meningococcal meningitis. (Refer to the original guideline document for additional information.) (Grade A, Level Ib)

B - If antibiotics other than ceftriaxone or cefotaxime were used to treat Haemophilus influenzae type b or meningococcal meningitis, rifampicin is given at the end of therapy to clear nasopharyngeal carriage. (Refer to the original guideline document for additional information.) (Grade B, Level IIb)

Urinary Tract Infections

GPP - Paediatric patient with a clinical diagnosis of urinary tract infection should have a urine sample obtained for culture and sensitivity before commencement of antibiotics.

Lower Urinary Tract Infection/Acute Cystitis

B - Patients with dysuria, urinary frequency, suprapubic pain, pyuria or balanitis can be managed on an outpatient basis. (Grade B, Level III)

All neonates, young infants and febrile children are excluded from this diagnosis. Antibiotics in order of preference are:

A - Cotrimoxazole (Dagan, Einhorn, & Lang, 1992; Grubbs et al., 1992; Howard & Howard, 1978): TMP 8mg plus SMX 40mg/kg/day divided 12hrly (contra-indicated in children with G6PD deficiency) (Grade A, Level Ib)

A - Nitrofurantoin (Lohr et al., 1981): 5-7mg/kg/day divided 6hrly (contra-indicated in children with G6PD deficiency) (Grade A, Level Ib)

A - Cephalosporins (McCracken et al., 1981) such as cephalexin, 50mg/kg/day divided 8hrly, especially in patients with G6PD deficiency (Grade A, Level Ib)

B - Trimethoprim (Rajkumar et al., 1988-89), especially in patients with G6PD deficiency: 6-8mg/kg/day divided 12hrly (Grade B, Level IIa)

Duration of treatment:

A - < 7 years old: 7-10 days (Grade A, Level Ia)

A - > 12 years old: 3 days of TMZ+SMX can be considered (Grade A, Level Ia)

C - 7-12 years old: 7-10 days (Grade C, Level IV)

Upper Urinary Tract Infection/Acute Pyelonephritis

Antibiotics in order of preference:

C - For a baby younger than 28 days old: Ampicillin plus gentamicin (Grade C, Level IV)

C - For an infant older than 28 days old: Gentamicin (Grade C, Level IV)

B - Ceftriaxone or cefotaxime:
For neonate with hyperbilirubinaemia, cefotaxime is preferred. (Grade B, Level III)

Duration of therapy:

GPP - Antibiotic regimes should be given for a total of 10 to 14 days.

GPP - Neonate <28 days old: intravenous therapy until no fever for 48-72 hours then convert to appropriate oral therapy based on culture/sensitivity.

GPP - Infant >28 days old: parenteral antibiotic therapy until clinical response has been demonstrated for 24 hours, then convert to appropriate oral therapy.

Bacterial Skin Infections

Impetigo

B - The majority of impetigo cases are caused by Staphylococcus aureus, some by a combination of both Staphylococcus aureus and Streptococcus pyogenes and few by Streptococcus pyogenes. The drug of choice is oral cloxacillin (30-50mg/kg/day divided 6hrly) or oral cephalexin (30-50mg/kg/day divided 8hrly) (Wortman, 1993). For children with penicillin allergy, alternatives include erythromycin (30-50mg/kg/day divided 6hrly) (Barton, Friedman, & Portilla, 1988; Tan, Tay, & Goh, 1998) or cotrimoxazole (TMP 8mg + SMX 40mg/kg/day divided 12hrly (Tan, Tay, & Goh, 1998); contra-indicated in children with G6PD deficiency). Duration of treatment ranges from 5 to 10 days. (Grade B, Level III)

Ecthyma

B - Ecthyma is caused by Streptococcus pyogenes, Staphylococcus aureus or a combination of the two organisms (Kelly, Taplin, & Allen, 1971). Treatment

consists of oral cloxacillin, cephalexin or erythromycin for 1 to 2 weeks (Galen et al., 1995). (Grade B, Level III)

GPP - Local cleansing with chlorhexidine twice daily is helpful.

Blistering dactylitis

B - Blistering dactylitis is usually caused by Streptococcus pyogenes (Hays & Mullard, 1975). Treatment involves incision and drainage of large blisters, and a 7 to 10 day course of penicillin V (25-50 mg/kg/day divided 6hrly), amoxycillin (20-50mg/kg/day divided 8hrly) or erythromycin (Galen et al., 1995; Wortman, 1993). (Grade B, Level III)

Folliculitis

B - Folliculitis is commonly caused by Staphylococcus aureus. Treatment consists of chlorhexidine wash and oral cloxacillin, cephalexin or erythromycin for 7 to 10 days (Wortman, 1993). (Grade B, Level III)

Furunculosis and carbuncles

B - Furunculosis and carbuncles are infection of hair follicles by Staphylococcus aureus. Larger lesions should be incised and drained if fluctuant (Dahl, 1987). Appropriate antibiotics include cloxacillin, cephalexin or erythromycin for 7 to 10 days or until inflammation has subsided (Kelly, Taplin, & Allen, 1971; Wortman, 1993). (Grade B, Level III)

B - Other measures include eliminating predisposing factors, using chlorhexidine cleanser, iron supplementation for refractory furunculosis with low serum iron and eliminating nasal carriage with chlorhexidine, bacitracin, tetracycline or 2% mupirocin ointment. However, long term and unrestricted use of mupirocin has been associated with the development of mupirocin resistance (Mandell, Benett, & Dolin, 2000). Therefore judicious use is advocated and only in methicillin-resistant Staphylococcus aureus (MRSA) carriers. (Grade B, Level IIa)

Cellulitis and erysipelas

B - Cellulitis and erysipelas can be treated with a combination of amoxycillin plus cloxacillin, cephalexin, erythromycin, or a combination of intravenous crystalline penicillin G (100,000-250,000 units/kg/day divided 6hrly) and cloxacillin. (Grade B, Level III)

For facial/periorbital cellulitis in young children, admission to hospital is warranted and the following antibiotics are recommended:

B - Intravenous ampicillin/sulbactam (150mg/kg/day divided 8hrly) (Kanra et al., 1996) (Grade B, Level III)

Or

C - Ceftriaxone (50-100 mg/kg/day intravenously divided 12-24hrly) (Grade C, Level IV)

Perianal streptococcal dermatitis

C - The recommended therapy for perianal streptococcal dermatitis is oral penicillin V, amoxycillin or erythromycin for 10 to 14 days (Barnett & Frieden, 1992). (Grade C, Level IV)

Necrotising fasciitis

C - Necrotising fasciitis is a medical emergency. Prompt surgical debridement is the most important aspect of therapy. High dose intravenous penicillin G (250,000-450,000 units/kg/day divided 4-6hrly) is used to treat Group A streptococcal infection. Additional antibiotics will depend on clinical assessment and culture results (Rathore, Barton, & Kaplan, 1992; Stevens, 1994). (Grade C, Level IV)

Staphylococcal scalded skin syndrome

C - Treatment includes hospitalisation, supportive measures and cloxacillin (Rudolph, Schwartz, & Leyden, 1974). (Grade C, Level IV)

Toxic shock syndrome

C - Besides hospitalisation, intravenous fluid support, cloxacillin $\pm$ clindamycin (25-40mg/kg/day divided 8hrly) is used in staphylococcal toxic shock syndrome (TSS) (Mandell, Benett, & Dolin, 2000; Resnick, 1992) and penicillin G and clindamycin in streptococcal toxic shock syndrome (Stevens et al., 1988). (Grade C, Level IV)

Methicillin-resistant Staphylococcus aureus infection

A - For nasal colonisation, topical mupirocin or topical fusidic acid plus oral cotrimoxazole can be used (Parras et al., 1995). (Grade A, Level Ib)

C - For mild to moderate infections, guided by culture sensitivity results, a combination of at least 2 oral antibiotics--fusidic acid (20-50mg/kg/day every 8hrly), clindamycin (10-40mg/kg/day divided 8hrly), cotrimoxazole (contra-indicated in children with G6PD deficiency), or minocycline (1-2 mg/kg/day divided 12hrly; not recommended for children younger than 8 years old) are recommended. (Grade C, Level IV)

C - For moderate to severe infection, vancomycin (40-60mg/kg/day divided 8-12hrly) is the antibiotic of choice. (Grade C, Level IV)

Definitions:

Grades of Recommendation

Grade A (evidence levels Ia, Ib) Requires at least one randomised controlled trial as part of the body of literature of overall good quality and consistency addressing the specific recommendation.

Grade B (evidence levels IIa, IIb, III) Requires availability of well conducted clinical studies but no randomised clinical trials on the topic of recommendation.

Grade C (evidence level IV) Requires evidence obtained from expert committee reports or opinions and/or clinical experiences of respected authorities. Indicates absence of directly applicable clinical studies of good quality.

GPP (good practice points) Recommended best practice based on the clinical experience of the guideline development group.

Levels of Evidence

Ia Evidence obtained from meta-analysis of randomised controlled trials.

Ib Evidence obtained from at least one randomised controlled trial.

IIa Evidence obtained from at least one well-designed controlled study without randomisation.

IIb Evidence obtained from at least one other type of well-designed quasi-experimental study.

III Evidence obtained from well-designed non-experimental descriptive studies, such as comparative studies, correlation studies and case studies, committee reports or opinions and/or clinical experiences of respected authorities.

IV Evidence obtained from expert committee reports or opinions and/or clinical experiences of respected authorities.

CLINICAL ALGORITHM(S)

The original guideline contains clinical algorithms for 1) the management of urinary tract infections in children; 2) approach to acute gastroenteritis.

EVIDENCE SUPPORTING THE RECOMMENDATIONS

REFERENCES SUPPORTING THE RECOMMENDATIONS

References open in a new window

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is identified and graded for each recommendation (see "Major Recommendations").

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

The indiscriminate or inappropriate use of antibiotics can accelerate the development of anti-microbial resistant bacterial strains. This has become an increasing source of concern for public health and infectious disease specialists as multi-drug resistance may be the Achilles heel in our war against bacteria. The judicious use of antibiotics (e.g. appropriate indications, selection and recommended dosages) is therefore an important way to reduce the problem of anti-microbial resistance.

POTENTIAL HARMS

Cotrimoxazole has a higher incidence of adverse drug reactions compared to cloxacillin or erythromycin.

CONTRAINDICATIONS

CONTRAINDICATIONS

- Tetracycline is contra-indicated in children younger than 8 years of age. However, in severe diarrhoea, the benefits may outweigh the risk of staining the developing teeth.
- Cotrimoxazole is contra-indicated in children with glucose-6-phosphate-dehydrogenase (G6PD) deficiency.

QUALIFYING STATEMENTS

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- These guidelines are not intended to serve as a standard of medical care. Standards of medical care are determined on the basis of all clinical data available for an individual case and are subject to change as scientific knowledge advances and patterns of care evolve.
- The contents of this publication are guidelines to clinical practice, based on the best available evidence at the time of development. Adherence to these guidelines may not ensure a successful outcome in every case, nor should they be construed as including all proper methods of care or excluding other acceptable methods of care. Each physician is ultimately responsible for the management of his/her unique patient in the light of the clinical data presented by the patient and the diagnostic and treatment options available.
- These guidelines serve as an aid to clinical practice and are not meant to be comprehensive, nor do they address all available antibiotics. High-risk patients such as those who are immunocompromised, have chronic debilitating disease or serious cardiopulmonary conditions are not covered in these guidelines. As disease states evolve, patient evaluation is important and the individual medical practitioner has to tailor the management to obtain the best outcome. The physician in charge should decide carefully the appropriate choice when antibiotics are indicated. It should be noted that the correct

choice of an antibiotic would depend on the clinical picture of the patient as well as the bacterial culture and sensitivity. It must be recognised that disease states may evolve along different paths and therefore, periodic patient evaluation is very important.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

IMPLEMENTATION TOOLS

Clinical Algorithm

For information about availability, see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better

IOM DOMAIN

Effectiveness
Safety

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Singapore Ministry of Health. Use of antibiotics in paediatric care. Singapore: Singapore Ministry of Health; 2002 Mar. 109 p. [193 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2002 Mar

GUIDELINE DEVELOPER(S)

Singapore Ministry of Health - National Government Agency [Non-U.S.]

SOURCE(S) OF FUNDING

Singapore Ministry of Health (MOH)

GUIDELINE COMMITTEE

Workgroup on Use of Antibiotics in Paediatric Care

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Workgroup Members: Dr Phua Kong Boo (Chairman); Dr June Lou; Dr Warren Lee; Dr Anne Goh Eng Kim; Dr Chao Sing Ming; Dr Ho Lai Yun; Dr Lim Fong Seng; Dr Lim Kim Whee; Prof Low Poh Sim; Dr Matthew Ng; Dr Simon Ng Pau Ling; Dr Steven Ng; Dr Winston Ng; Dr Ong Eng Keow; Dr Ooi Boo Chye; Prof Quak Seng Hock; Dr Lynette Shek; Dr Sim Sze Keen; Dr Tan See Leng; Dr Agnes Tay; Dr Tay Yong Kwang; Prof Ti Tiow Yee; Dr Yip Yeng Yoong; Mr Yeoh Siang Fei; Dr Allen Wang (Secretariat)

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format (PDF) from the Singapore Ministry of Health Web site.

Print copies: Available from the Singapore Ministry of Health, College of Medicine Building, Mezzanine Floor 16 College Rd, Singapore 169854.

AVAILABILITY OF COMPANION DOCUMENTS

None available

PATIENT RESOURCES

None available

NGC STATUS

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